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A NATIONAL POLICY FOR EDUCATIONAL TELEVISION.
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THE PANEL WAS ASKED TO STUDY NEW DEVELOPMENTS IN COMMUNICATIONS AND EDUCATIONAL MEDIA AND TO MAKE RECOMMENDATIONS TO THE U.S. COMMISSIONER OF EDUCATION ON NATIONAL EDUCATIONAL POLICY. THE MOST SIGNIFICANT NATIONAL PROBLEM WAS FOUND TO CONCERN EDUCATIONAL TELEVISION. THE MAJOR QUESTIONS RAISED BY THE PANEL CONCERNED (1) THE FUTURE GROWTH CURVE OF EDUCATIONAL TV, (2) IMPROVEMENT OF PROGRAMS, (3) CONTIBUTIONS OF TV TO EDUCATION, (4) MANPOWER FOR EDUCATIONAL TV, (5) FINANCING FOR EDUCATIONAL TV, (6) CHANNEL ALLOCATIONS FOR EDUCATIONAL TV, AND (7) GUIDANCE FOR EDUCATIONAL INSTITUTIONS REGARDING TV FACILITIES. (MS)

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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# A NATIONAL POLICY

# FOR

# EDUCATIONAL TELEVISION

Report and Recommendations

Submitted to the U. S. Commissioner of Education
by the
Educational Media Study Panel

December 1961

EM 005 916

The Educational Media Study Panel was established in 1960 as an official advisory group to the Commissioner and the U. S. Office of Education. The membership of the Panel has included the following representatives from business, industry, and education:

Mr. Cyril M. Braum,[1] Engineering Consultant
National Educational Television and Radio Center

Hon. LeRoy Collins,[2] President
National Association of Broadcasters

Mr. Leland Hazard, Vice President and General Counsel
Pittsburgh Plate Glass Company

Mr. Richard B. Hull, Director
Telecommunications Center, Ohio State University

Dr. Herold C. Hunt, Professor of Education
Harvard University

Dr. Kenneth E. Oberholtzer, Superintendent of Schools
Denver, Colorado

Dr. John R. Richards,[3] Director
Coordinating Council for Higher Education, California

Mr. William E. Spaulding, President
Houghton Mifflin Company

Mr. Graham T. Winslow, Chairman of the Board
Massachusetts Council for the Public Schools

The Panel was asked to study the new and rapidly growing developments in the communications and educational media field and to make recommendations to the Commissioner which would be useful in developing sound national policy. The need for such a Panel and study arose from new technological advances and from the expanded and intensive research and utilization which have resulted from the implementation of Title VII of the National Defense Education Act.

As a result of inquiries and surveys encouraged by the Panel, it became apparent that of all the new media of communication, educational television presented the most immediate and significant national problem.

In less than ten years, educational television has reached a point where more than 60 broadcasting stations are now on the air, serving schools by day and homes by night. A program center in New York serves as "network" headquarters for these stations, enabling them to exchange their own best programs, and furnishing other program materials on videotape and film. Between two and three hundred closed-circuit

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1/ Engineering Consultant, Joint Council on Educational Television, at the time of Panel formation.
2/ Governor, State of Florida, during participation as Panel member.
3/ Chancellor, Oregon Board of Higher Education, at the time of Panel formation.

television systems have been installed by local public schools, school districts, colleges, and universities for direct systematic instruction and to share superior teaching and educational resources. Heralding the day when the best teaching may be shared even more widely, an airplane is now flying over central Indiana, broadcasting televised class lessons to schools in parts of six States.

The audiences of educational television are no longer mere handfuls. In cities where educational stations are in operation and well established, nearly one out of four adults is a regular viewer. The number of school children who have received some teaching by television is now in the millions.

Apparently, an even more explosive period of growth lies ahead. At least 40 new stations are in some stage of preparation. Several hundred educational institutions are now making plans for extending the use of closed-circuit television. Following the lead of Alabama, Oklahoma, Florida, North Carolina, and Texas, nearly a dozen States are planning Statewide educational television networks. In the Middle West and in New England, plans are being drawn for regional networks. A national "live" network, connecting educational stations by cable or microwave may not be far in the future. The possibility of an educational communications satellite, instantaneously relaying programs for national and hemispheric coverage, is a foreseeable reality.

This growth, development, and impact of educational television, with the immediate problems and concerns which it has raised, motivated the Panel to sharpen focus of its study, and to concentrate its initial attention upon television. To this end, the Panel members proceeded to obtain summary reports on the background, development, and present status of the various uses of television in education, consulted with key research authorities conducting special studies in the field, and heard testimony and statements offered by more than a dozen national leaders, including such authorities as Arthur Adams, George V. Allen, C. Scott Fletcher, Frederick Ford, Fred Hechinger, Francis Keppel, Harold Lasswell, Max Lerner, Ralph McGill, Roger Revelle, Wilbur Schramm, Gilbert Seldes, Carleton Sprague Smith, Frank Stanton, and others.

Out of these reports and hearings, a number of questions was raised and certain suggestions and conclusions were drawn. The major questions, issues, and guidelines which emerged from the discussions held were identified by the Panel as follows:

## 1. WHAT IS THE GROWTH CURVE OF EDUCATIONAL TELEVISION LIKELY TO BE?

The number of stations serving their communities with cultural, artistic, and public service programs has increased steadily, and the rate shows no sign of slackening. Furthermore, recent surveys show that the audiences for these stations have increased substantially in the last two years. More and more schools and colleges are indicating that instructional television is part of their future plans. A large number of school officials believe that, ten years from now, television will carry some part of the teaching of the great majority of school children in this Nation, and that it will be used increasingly for direct instruction in the large colleges and universities. It is also expected that television will make available to home students of whatever age, a large part of the college curriculum. Thus, education may become easily available at any time of life.

The growing proportion of leisure time in our society, and the increasing complexity of the knowledge a citizen must have about the world in which he lives, point to a constantly growing need for educational television broadcasting services in the community. By the same token, the population explosion and the rising costs of buildings and services, as well as the generally greater demands for educational quality, suggest a constantly growing need for direct instructional television in the schools. A medium with so much potential, with so many needs to meet, and so many plans being made for it, is likely to continue to grow for a long period of time. (The vital importance of educational television to National Defense efforts is not stressed in this report, but argues for more adequate service.)

## 2. HOW CAN THE PROGRAMS OF EDUCATIONAL STATIONS BE IMPROVED?

Distinguished programming costs money. At the present time, the total program cost of educational television stations nationwide is about equivalent to the cost of one network series on commercial television. The total annual budget of most educational stations is far less than the cost of a single commercial television "spectacular." Only a small number of non-commercial stations have the equipment necessary to originate and produce "remote" telecasts of events outside the studio. The educational stations do not have a "live" network nationally, and, therefore, many timely programs are unavailable to them.

However, money alone will not necessarily produce outstanding and distinguished programs. There are two additional requirements--talented writers, producers, performers, and program managers, and a clear and viable policy as to what audience is being served. Better financing for educational stations will help to bring in talent, but the policy is relatively independent of financing, except in the sense that money is required to implement any policy to the degree that it should be implemented.

The present audience of educational television includes a large proportion of highly educated persons, professional men and women, and persons who are influential in forming public opinion and determining the cultural tone of their communities. This is a tremendously potent group of people. However, educational television, as it grows in resources and skill, can appeal increasingly to larger audiences. It should be possible in time to furnish at least some cultural and intellectual stimulation on occasion to a very high proportion of the total audience. For the most part, the cultural and intellectual capabilities of the American people have been underestimated by the mass media. The challenge to educational television is to develop in its programs the skill in writing and production, and the understanding of the audience required to serve these capabilities.

In seeking to stimulate thought and discussion at a high level among its viewers, educational television has a great potential ally. This is the existing structure of community learning activities--organized discussion groups, study groups, vocational interest groups, and the like. If educational television can create a series of programs to feed and stimulate these groups, it will then be in a position to supplement its direct effect with active learning experience, to enrich the work of the existing groups, and to increase the impact of its broadcasts.

## 3. HOW CAN TELEVISION CONTRIBUTE MOST TO EDUCATION?

Television is a channel for conveying whatever is put into it. Instructional television, or television designed for direct use in the classroom, must depend importantly upon classroom teacher guidance for determination of its content, presentation, and effective utilization. But while instructional television may change some of the things the classroom teacher does, the major change will be in the direction of freeing a teacher for more productive use of his time (e.g., working with individuals), rather than restricting him.

The spectrum of instructional uses of television is not completely known. It is clear that there are some teaching acts it can do superlatively well. It can let a large number of students look into a microscope at the same time or watch surgical procedures from close at hand. It can let a class watch an activity that would be spoiled by direct observation. It can share great teaching and great demonstrations. But there are also some things it cannot do. It cannot conduct a seminar discussion efficiently. It cannot give specific and direct personal help. These uses and limitations are clear, but how much longer the list may be is not known.

It is clear that there are some ways of using television which make for better learning than others; some ways of putting school materials on television which result in better teaching than others; some ways of combining television with other learning experiences in school that are more effective than others. But preoccupation with television sometimes obscures the fact that it is only one of the teaching resources available to the modern school. The modern teacher has books, guides, periodicals, films, tapes, slides, records, laboratory equipment; some have language laboratories; and soon many of them will have programmed self-instructional materials. The basic question, therefore, is not simply how to use television alone but rather how to combine it most effectively with other learning experiences and resources.

Experience indicates that the most effective uses of television have been in situations where it has been combined carefully with other activities in a total learning situation and where students were strongly motivated to learn from it. This challenges educators to make a broad review and restructuring of what happens in the classroom. Television can share the best teaching and the best demonstrations; self-instructional materials can conduct drill expertly and give the student a new freedom to work at his own best rate. A teacher who has these devices working for him may not have exactly the same duties as before, but his duties will be no less important. The student who has these devices working for him will not spend his day exactly as before, but his learning opportunities will be no less and probably considerably more.

A school where these new devices are in use may find itself bursting out of old patterns. Instead of classes of 35 alternately being lectured to, studying, and reciting, it may assemble groups of several hundred to watch the television lecture

or demonstration but devote a greater proportion of its teacher time to individualized instruction. Instead of waiting his turn for class drill, a student may follow his own drill schedule with self-instructional materials or language laboratory.

The well-planned television program can motivate students, guide and sharpen their reading by providing background and demonstrations, encourage responsibility for independent learning, arouse curiosity and develop new insights and the excitement of discovery. The medium is so flexible that it need never be used merely to promulgate the old lecture method and the idea that good teaching is "telling." In the richness and versatility of television, the classroom teacher will be faced with a new challenge. The teaching required to meet the individual interests, needs, and problems of his students and to encourage them in their individual learning experiences will call for all his talent. He will be devoting his time to the kind of teaching that has satisfaction, rewards, and excitement far beyond those of routine group instruction.

The possibility of being able to arrive at a new and more efficient distribution of student activities and teacher responsibilities in which the talents of both and their time in the classroom will be more efficiently used is the great hope for a "breakthrough" that instructional television holds out. Without the new devices now available, this greater flexibility would be immeasurably more difficult to achieve. Now that the amount of learning that takes place in our schools has taken on new importance, it is fortunate that these new tools are available to encourage a fundamental review of classroom practices and procedures.

## 4. HOW CAN THE STRENGTHS IN EDUCATIONAL TELEVISION BE SHARED?

Many of the practices of educational television do not take advantage of the fact that it can serve the Nation as a whole. The shape of the future in educational television clearly includes a national, and perhaps several regional centers, for the exchange and evaluation of television teaching materials. It also includes a gradual and increasing interconnection of educational broadcasting stations. Some State networks exist, more are being planned. Plans are also being made for regional networks. Undoubtedly, these developments are preludes to a nationally interconnected educational network. Until we do have a nationwide interconnection of educational stations, and a national system of production, evaluation, and exchange of instructional television materials, educational television will not be able to work at its full strength for the public good.

## 5. WHAT SPECIALLY TRAINED MANPOWER WILL EDUCATIONAL TELEVISION NEED?

Expert and imaginative personnel are essential if non-commercial educational stations are to realize their potential. The educational station must have employees familiar with the content of educational and cultural materials. Courses in

these areas should become part of the college preparation of production personnel for educational television, and the educational stations should operate their own in-service training programs, perhaps in conjunction with neighboring schools and colleges.

One of the urgent needs of all television, commercial or non-commercial, is for a pool of creative talent (writers, directors, performers, technicians). To the extent that its finances permit, educational television should take the lead in seeking out such persons, encouraging the training of more of them, and giving them an opportunity to use their talents in the medium. One of the requirements for attracting such talent, and for attracting excellence in general, to educational television is the ability to pay adequate salaries. If educational television can strengthen its financial basis so as to be able to offer higher salaries, it will be in a far better position to offer the kind of excellent and professional program service that is necessary to the fulfillment of its objectives.

In the schools, more and more teachers will need to become familiar with the skills of teaching on and/or with television. This will require in-service training programs, summer courses, workshops, and new opportunities for gaining experience with television.

Television programs which are to be conceived and developed as part of a total systems approach will require, for a new order of collaboration among subject-matter and curriculum experts, talented persons enjoying a very high degree of skill in the analysis of teaching techniques to meet specific objectives, experienced teachers, writers, artists, directors, and imaginative technicians. Every individual serving on such a team must become highly sensitive to the potential values of television as a medium and to the subtleties of teaching and learning intended to achieve clearly defined objectives.

Numerically, the greatest need in the schools will be for a large number of classroom teachers able to make television a part of the total learning experience of students, and able to weave it into classroom activities. Colleges, universities, and particularly schools of education can be of great help in developing this skill, and the schools themselves can profitably share their experiences in utilizing television.

## 6. HOW CAN EDUCATIONAL TELEVISION BE FINANCED ADEQUATELY?

Compared to the present cost of educational television, the bill for the kind of service needed will be large. Compared to the cost of commercial television, or of organized education, the bill will be small. The capital cost of 56 non-commercial educational stations has been about $29 million. Their annual operating budget is around $15 million. They are furnished programs by the National Educational Television and Radio Center for which the present annual budget is $3.6 million. The schools and colleges have installed between 200 and 300 closed-circuit television systems at an estimated capital cost of around $11 million, and an annual operating cost of around $4 million.

Looking ahead ten years, we can anticipate a doubling of the number of educational stations, at additional capital costs of about $30 million, and additional operating costs of another $15 million. In some combinations of closed-circuit and low power transmitters, the schools may spend as much as $50 million more in capital costs to develop instructional television facilities, and the annual cost of operating these installations more fully than the present installations may run to $150 million.

The present levels of annual expenditure for the national program center and the local non-commercial stations are insufficient for the quality of program service required. In the past, the operating funds of the non-commercial stations have come, in various proportions, from five sources, according to the type of station represented (community, school or university, State network): (1) membership contributions from the public; (2) contributions from business, industry, and other civic groups; (3) foundation grants; (4) contracts for the production of programs; (5) tax funds from school systems, universities, colleges, and other educational groups. The support of the national program center has come from three sources: (1) foundations, (2) production contracts, and (3) business and industry. The continuing support of all these sources for both the stations and the network will be most important. However, financing is now the chief factor limiting the quality and amount of service educational television is able to provide. Unless the financial barrier can be breached, unless the amount of support can be increased to a substantial degree, the bright promise of educational television will remain no more than a promise.

## 7. WHAT CHANNEL ALLOCATIONS WILL EDUCATIONAL TELEVISION NEED TO DO ITS JOB?

Most television in the United States is presently in the VHF (Very High Frequency) band which provides 12 channels and requires rather wide separation of stations on the same channels. VHF channels are in short supply in most of the cities and metropolitan communities of the Nation. In many cities, there is no VHF channel for education. This is the case in some of the largest communities of the Nation. For example, there is no VHF channel presently available to education in Los Angeles, Baltimore, Washington, Cleveland, Columbus, or Detroit.

There is still a great deal of room available in the UHF (Ultra High Frequency) band which offers more channels than VHF, but smaller areas of coverage. Only a small percentage of the receiving sets now in use are equipped to receive UHF. Therefore, if a new station is added in the UHF band in a community where the existing stations operate in VHF, the new station cannot be received until new television sets are purchased or UHF converters are installed.

These matters are exceedingly important to educational television because of its expected expansion. If it is indeed the case that the number of educational stations will double in the next ten years, and that there will also be a large, though as yet undetermined, number of low power stations serving schools, colleges, and universities, then the problem of finding and allocating channels will be a very complex one, and the solution to the problem is bound to be most difficult. It

is clear that the nature and magnitude of anticipated future needs should be made immediately known to the Federal Communications Commission, and that these recommendations should concern the full use and reservation of education's fair share of all spectrum resources.

## 8. WHAT GUIDANCE DO EDUCATIONAL INSTITUTIONS NEED ON TELEVISION FACILITIES?

No one can predict with confidence either what equipment will be available for television ten years hence, or what institutions will be using it. However, it appears quite certain that technical developments will come quickly and that every stage and part of education is a potential user of educational television. Therefore, in planning new buildings, the best guideline is to provide for the possible future use of television in any building where teaching is to be done, and to try, in general, to design such buildings with a maximum of flexibility for different sizes of viewing groups and different uses of television, not all of which are yet foreseen. If it is true that television and other new developments open the door to a considerable revision of classroom organization and activities, then physical facilities should be kept as flexibile as possible until the nature of these changes becomes apparent. In selecting television equipment now, or in designing and arranging rooms for viewing or production, the educational administrator and the television director have expert advice available and should make use of it.

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In summary of these facts and findings, the Study Panel suggests the following general guidelines:

(1) If educational television is to continue to grow in importance and use both in the home and in the school, long-range plans for its growth and development are needed now.

(2) If the medium is to reach its full potential, there must be increased and continuing efforts to develop new and improved techniques of programming for both in-school and out-of-school audiences, to encourage and support greater creativity, and to raise the cultural and informational values of the service to a new level.

(3) If the medium is to fulfill completely its promise of aid to the educational system, the better and more effective ways of utilizing it must be identified. Particularly, there must be new patterns of educational planning and curriculum design which will relate all media and learning resources in a common effort to fulfill optimum learning requirements. Research can profitably move into these problems.

(4) Improvement in the school and community services of educational television is closely related to its financing. The promise of the medium cannot be fulfilled unless the financial support of educational television stations, programs, and services is broadened and expanded. A continued growth is called for in local community financial support and, in addition, some form of local and State tax-based support, and some form of Federal aid or assistance for the development of new stations, programs, and national and State educational television services.

(5) The need for sharing new and superior programs grows in importance as such programs are created. The organization of State and regional educational television networks is, therefore, a desirable development, looking toward the ultimate establishment of a national "live" interconnected network. As a source of production and exchange for such a service, the present national educational program service and videotape "network" need to be strengthened in order that the qualitative improvement of this important supply of programs may be continued.

(6) In order to share instructional television materials, regional and national centers for the production, evaluation, and exchange of such recordings are needed. So that this exchange may proceed efficiently and with fairness to all, a study of the problems of recording, distribution, teacher rights, compensation, and residual uses of educational and instructional television programs and materials is also needed at the first possible moment.

(7) Healthful community development of educational television will require, not only that it serve its present basic audiences more effectively, but also that it find the means of broadening its audiences and extending its services, and that it become more closely identified with the learning activity and experience of the entire community.

(8) The quality of educational television will be no higher than the quality of the men who make its programs and operate its stations and services. The combined efforts of schools, colleges, universities, and educational and commercial television stations will be needed to develop the creative talent and professional personnel required to plan and produce the highest quality programs for educational use.

(9) Another crucial personnel need will be for teachers expert in using television and other new media in their classrooms. Workshops, seminars, training programs, and publications will be needed for the in-service training of teachers in this skill. A major effort by colleges and universities will be needed to prepare their students who will enter the educational profession to be able to make effective use of the new media in their teaching.

(10) The future development of "open-circuit" educational television is limited by the channels available to carry its signals. It is imperative, therefore, that every effort be made to reserve the necessary spectrum resources required by the anticipated growth and development of educational television.

(11) Schools and school administrators will be well advised, in the design of school buildings and in the purchase of technical equipment and facilities, to provide for the planning, installation, and future use of educational television and the other new media.

## RECOMMENDATIONS

The Educational Media Study Panel believes that educational television has a unique and significant role to play in both the extension and improvement of the educational and cultural environment necessary to the fulfillment of our national interests.

Therefore, the Panel offers the following specific recommendations to the Commissioner and the Office of Education for consideration in relation to national policy:

A. The opportunities afforded by television must become more readily available for education (from classroom cables to relay stations in outer space).

The advent of television and, indeed, the whole complex of newer communications media (from videotape to satellites) has given American citizens unparalleled opportunities to advance in their ability to record and communicate ideas. These new communications resources must now be harnessed to serve the ends of education in a time when American school and college programs must find new and improved ways to cope with spiraling enrollments and increasing shortages of adequate classrooms and able teachers, as well as the new educational needs created by the explosions in new knowledge and by the changing world conditions which threaten national survival.

We recommend that the Federal Government take the steps necessary to assure for every American the opportunity to receive ETV signals: and more specifically, to reserve those parts and amounts of the broadcast spectrum and related electronic resources necessary to guarantee nationwide transmission and reception of the full range of educational television services.

B. Educational television PROGRAMS must be produced in sufficient number and quality to meet critical educational needs in both the present and the future.

Two broad philosophies have thus far governed the growth of television in the United States: (1) the concept of competitive free enterprise, entertainment-centered program service based on popular appeal containing significant, but limited, segments of news, public affairs, and cultural offerings supported by advertising revenue; and (2) the concept of an alternative, noncommercial educational television service whose programs, directed at audiences of mature adults and out-of-school children, would emphasize most what commercial systems tend to emphasize least and, additionally, would serve as a distributor of instructional materials conceived within the framework of formal education and directed to enrolled students. These two philosophies are complementary, rather than opposing, and result in differences in emphasis and depth at given times in given programs, in types of audience, and in potential audience size.

But the needs of America for television cannot be met by the present commercial and educational television systems. Nor can the massive new problems of education await solution by traditional methods which utilize only existing facilities. Realization of the goal of equal educational opportunity for all now rests increasingly on the national ability to use effectively electronic technology for educational purposes.

We recommend public as well as private support of a new, vigorous, and coordinated national effort on the part of American schools, colleges, communities, government agencies, and other interested groups to encourage the production of more and better educational television programs addressed to the needs of our time.

C. Sound RESEARCH and experimentation are keys to quality in ETV.

The new media and devices now available to education hold as much promise for improvement of instruction as did the invention of the book. This promise will never be fulfilled unless we continue, through study and research, to deepen our understanding of their use.

Until recent years, the so-called newer media (i.e., films, radio, filmstrips, etc.) have most frequently been considered "aids" or have simply been regarded as devices incidental to the traditional processes of education as carried on in a classroom. Today, television is regarded not only as a medium in its own right, but as a device which can uniquely transmit sound, live images, film, print and charts, and thus can serve as a distribution system for all other media. More importantly, it provides a new kind of linkage from one classroom to another, to laboratories, and to any part of the world outside.

The results of research completed during the past decade underline the need for continuing and expanding programs of research and development directed toward realization of new levels of teaching and learning which utilize more efficiently the instructional and communications media.

We recommend a continuing nationwide program of research and evaluation which will help to identify and increase both the worth and efficiency of ETV.

D. A new reservoir of MANPOWER must be recruited and trained for ETV.

The increasing shortage of skilled ETV personnel and other media specialists is not confined to administrative and managerial areas, but extends to every aspect of ETV efforts. It embraces every type of communications engineering, from the transmitter to the videotape recording room, and culminates (acutely) in the area of talent--the skilled teacher of subject matter, the analyst of public and world affairs, the performing artist, the creative producer and writer. A comprehensive approach to the problems posed would involve a personnel inventory of experienced and potentially gifted individuals in media fields, systematic "crash" programs to re-train individuals who might be recruited to the new field, and long-range plans for developing individuals in what has become a new professional service field. Without such a systematic and comprehensive approach on a national basis, it will be impossible to produce the personnel needed to mount a major attack on education's problems using the media.

We recommend that a nationwide talent search and training effort be launched by schools, colleges, and stations to create and keep in full supply a reservoir of personnel qualified to serve in all "departments" of educational television.

E. A new plan for increased FINANCIAL SUPPORT must be established to provide the dollars needed for ETV.

Despite educational television's impressive record of growth in its first decade (with more than 60 stations now on the air and several hundred closed-circuit installations), no adequate local, State, regional, or national plan of financing new stations or for expansion of existing facilities has yet been developed, nor has an adequate plan been put forward to meet the costs of operation.

If educational television is to fulfill its role in providing a new dimension for cultural and educational opportunities, a new kind and amount of financial support must be provided.

We recommend that financial support for educational television be provided from both public and private funds at the local, State, and the national level to ensure that the necessary new stations may be built and that the facilities may be operated and programmed to the fullest degree in the public interest.

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